

CLAIMS

What is claimed is:

1. A hollow fan blade detail half comprising:

a substrate having a root edge and an opposite tip spaced radially outward from the root, the substrate further including a leading edge opposite a trailing edge, the leading edge spaced chordwise from the trailing edge; and

a plurality of tapered ribs formed on the substrate, each of the ribs adjacent a cavity, the rib transitioning from the taper to a compound radius in the cavity.
2. The hollow fan blade detail half of claim 1 wherein each cavity forms an arch.
3. The hollow fan blade detail half of claim 1 wherein widths of the cavities are each less than 10 times a thickness of the substrate in the associated cavity.
4. The hollow fan blade detail half of claim 1 wherein the plurality of ribs do not intersect one another.
5. The hollow fan blade detail half of claim 4 wherein the plurality of ribs are each freestanding, such that they do not intersect any other ribs.
6. The hollow fan blade detail half of claim 5 wherein the plurality of ribs are parallel in a region adjacent the root edge.

7. A hollow fan blade including a pair of joined hollow fan blade detail halves according to claim 6 wherein ribs in one of the pair of hollow fan blade detail halves are joined to corresponding ribs in the other of the pair.

8. A gas turbine engine including a plurality of the hollow fan blades of claim 7.

9. The hollow fan blade detail half of claim 1 wherein each of the plurality of ribs is formed between elongated continuous cavities in the substrate.

10. The hollow fan blade detail half of claim 9 wherein the elongated cavities on either side of each of the plurality of ribs are continuous with one another around at least one end of the rib.

11. A method for making a hollow fan blade including the steps of:
 - a. forming a plurality of ribs on a first substrate, the first substrate including cavities on either side of each of the plurality of ribs;
 - b. abutting the plurality of ribs on the first substrate with a second substrate to form a hollow fan blade;
 - c. forming the hollow fan blade into an airfoil shape while pressure inside the cavities is substantially ambient pressure.
12. The method of claim 11 wherein said step c) further includes the step of subjecting the hollow fan blade to high temperature while forming the airfoil shape.
13. The method of claim 11 wherein the cavities are not pressurized during said step c) in order to prevent collapse of the cavities.
14. The method of claim 11 further including the step of forming a plurality of ribs on the second substrate and wherein said step b) further includes the step of abutting the ribs on the first substrate with the ribs on the second substrate.
15. The method of claim 11 wherein each of the ribs is tapered to transition into a compound radius in an adjacent one of the cavities.

16. The method of claim 11 wherein said step c) further includes the step of applying a forming load having a load vector and wherein the plurality of ribs are each in a parallel plane parallel to the load vector.

17. The method of claim 11 wherein widths of the cavities are each less than 10 times a thickness of the substrate in the associated cavity.